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Transport in Topological Insulator Thin Films VALLA FATEMI, HADAR STEINBERG, JEAN-BAPTISTE LALOE, FERHAT KATMIS, LUCAS ORONA, JAGADEESH MOODERA, PABLO JARILLO-HERRERO, MIT — We report on electronic transport measurements on Bi2Se3 thin-film devices and show that an ambipolar modulation can be achieved via the electric field effect by using a top-gate with a high-k dielectric insulator. By analyzing the evolution of the weak anti-localization magnetoconductance behavior with respect to gate voltage and temperature, we find that we are able to modulate the effective number of channels, demonstrating that the coherent coupling between the surface and the bulk is tunable. Moreover, we investigate the formation and behavior of tunable p-n junctions on thin-film devices with multiple local top-gates.

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